



## Numerical simulation study of polar lows in Russian Arctic: dynamical characteristics

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Polar Lows (hereafter PL) are intensive mesoscale cyclones, appearing above the sea surface, usually behind the arctic front and characterized by severe weather conditions [1].

All in consequence of the global warming PLs started to emerge in the arctic water area as well – in summer and autumn. The research goal is to examine PLs by considering multisensory data and the resulting numerical mesoscale model. The main purpose was to realize which conditions induce PL development in such thermodynamically unusual season and region as Kara sea. In order to conduct the analysis we used visible and infrared images from MODIS (Aqua). Atmospheric water vapor  $V$ , cloud liquid water  $Q$  content and surface wind fields  $W$  were resampled by examining AMSR-E microwave radiometer data (Aqua)[2], the last one was additionally extracted from QuickSCAT scatterometer.

We have selected some PL cases in Kara sea, appeared in autumn of 2007-2008. Life span of the PL was between 24 to 36 hours. Vortexes' characteristics were:  $W$  from 15m/s,  $Q$  and  $V$  values: 0.08-0.11 kg/m<sup>2</sup> and 8-15 kg/m<sup>2</sup> relatively.

Numerical experiments were carried out with Weather Research and Forecasting model (WRF), which was installed on supercomputer "Lomonosov" of Research Computing Center of Moscow State University [3]. As initial conditions was used reanalysis data ERA-Interim from European Centre for Medium-Range Weather Forecasts. Numerical experiments were made with 5 km spatial resolution, with Goddard center microphysical parameterization and explicit convection simulation.

Modeling fields were compared with satellite observations and shown good accordance. Than dynamic characteristics were analyzed: evolution of potential and absolute vorticity [4], surface heat and momentum fluxes, and CAPE and WISHE mechanisms realization.

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